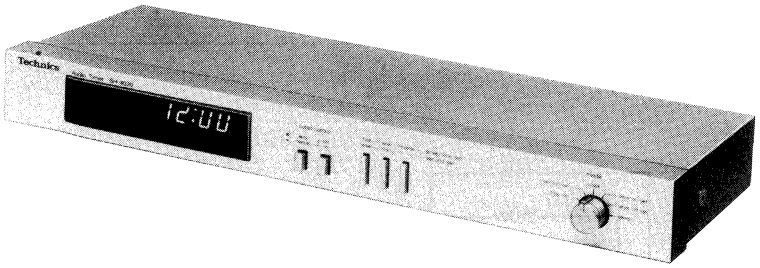
ORDER NO. SD82032153C2

Service Manual

Audio Timer

SH-4020

[EG],[EF],[EK],[EH],
[EB],[DX],[EW],[DM],[Ei]



Areas

* [EG] is available in F.R. Germany.
* [EF] is available in France.
* [EK] is available in United Kingdom.
* [EH] is available in Holland.
* [EB] is available in Belgium.
* [DX] is available in Scandinavia.
* [EW] is available in Switzerland
* [DM] is available in Denmark.
* [Ei] is available in Italy.

English

Specifications

(Specifications are subject to change without notice for further improvement.)

Switch construction	Single pole-single throw
Clock accuracy	Synchronizes with frequency of power source
Timer accuracy	0 ~ +0.02 second against preset time
Clock	24-hour indication
Sleep timer	1 min. ~ 1 hour, 59 min.
Setting intervals	1 min. ~ 23 hours, 59 min.
Power supply	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Power consumption	7W for operation of timer

Power capacity

for Denmark and Switzerland

Total 600W Max or each 275W Max (110V, 120V)
Total 1200W Max or each 550W Max (220V, 240V)

for other areas

600W Max (110V, 120V), 1200W Max (220V, 240V)

Dimensions (W×H×D)

for Denmark and Switzerland	430 × 53 × 167 mm (16-15/16" × 2-3/32" × 6-9/16")
for other areas	430 × 53 × 156 mm (16-15/16" × 2-3/32" × 6-5/32")

Weight

for Denmark and Switzerland	1.8 kg (4.0 lb.)
for other areas	1.9 kg (4.2 lb.)

Deutsch

TECHNISCHE DATEN

(Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

Schaltung	Doppelpol-Einrichtschaltung
Uhrenpräzision	Mit der Stromfrequenz synchronisiert
Timerpräzision	0 ~ +0,02 Sekunden zur eingestellten Zeit
Uhr	24-Stunden-Anzeige
Sleep timer	1 Min. bis 1 Std. 59 Min.
Einschaltdaurer	1 Min. bis 23 Stdn. 59 Min.
Netzspannung	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Stromverbrauch	7W für den Gebrauch des Timers

Stromstärke

Dänemark und Schweiz

Total 600W max. oder je 275W max. (110V, 120V)
Total 1200W max. oder je 550W max. (220V, 240V)

andere Länder 600W max. (110V, 120V)
1200W max. (220V, 240V)

Abmessungen (B×H×T)

Dänemark und Schweiz	430 × 53 × 167 mm
andere Länder	430 × 53 × 156 mm

Gewicht

Dänemark und Schweiz	1,8 kg
andere Länder	1,9 kg

Français

CARACTERISTIQUES (Sujet á changement sans préaris.)

Agencement des commutateurs	type bipolaire à une direction
Précision de l'horloge	Synchronisée avec la fréquence de la source de courant
Précision de du chronorupteur	0 ~ +0,02 seconde
Horloge	Affichage basé sur le système des 24 heures
Sleep timer	1 min. ~ 1 hour, 59 min.
Intervalles de réglage	De 1 minute à 23 heures, 59 minutes
Alimentation	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Consommation	7W pour le fonctionnement du chronorupteur

Pouvoir de consommation

pour le Danemark et la Suisse

Total 600W Max or each 275W Max (110V, 120V)
Total 1200W Max or each 550W Max (220V, 240V)

pour d'autres régions

600W Max (110V, 120V), 1200W Max (220V, 240V)

Dimensions (L×H×Pr)

pour le Danemark et la Suisse	430 × 53 × 167 mm
pour d'autres régions	430 × 53 × 156 mm

Poids

pour le Danemark et la Suisse	1,8 kg
pour d'autres régions	1,9 kg

Nota:
La Société NATIONAL-PANASONIC-FRANCE, importateur du matériel MATSUSHITA-ELECTRIC déclare que cet appareil est conforme aux prescriptions de la directive 76/889/C.E.E. (arrêté 14 Janvier 1980).

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

SH-4020

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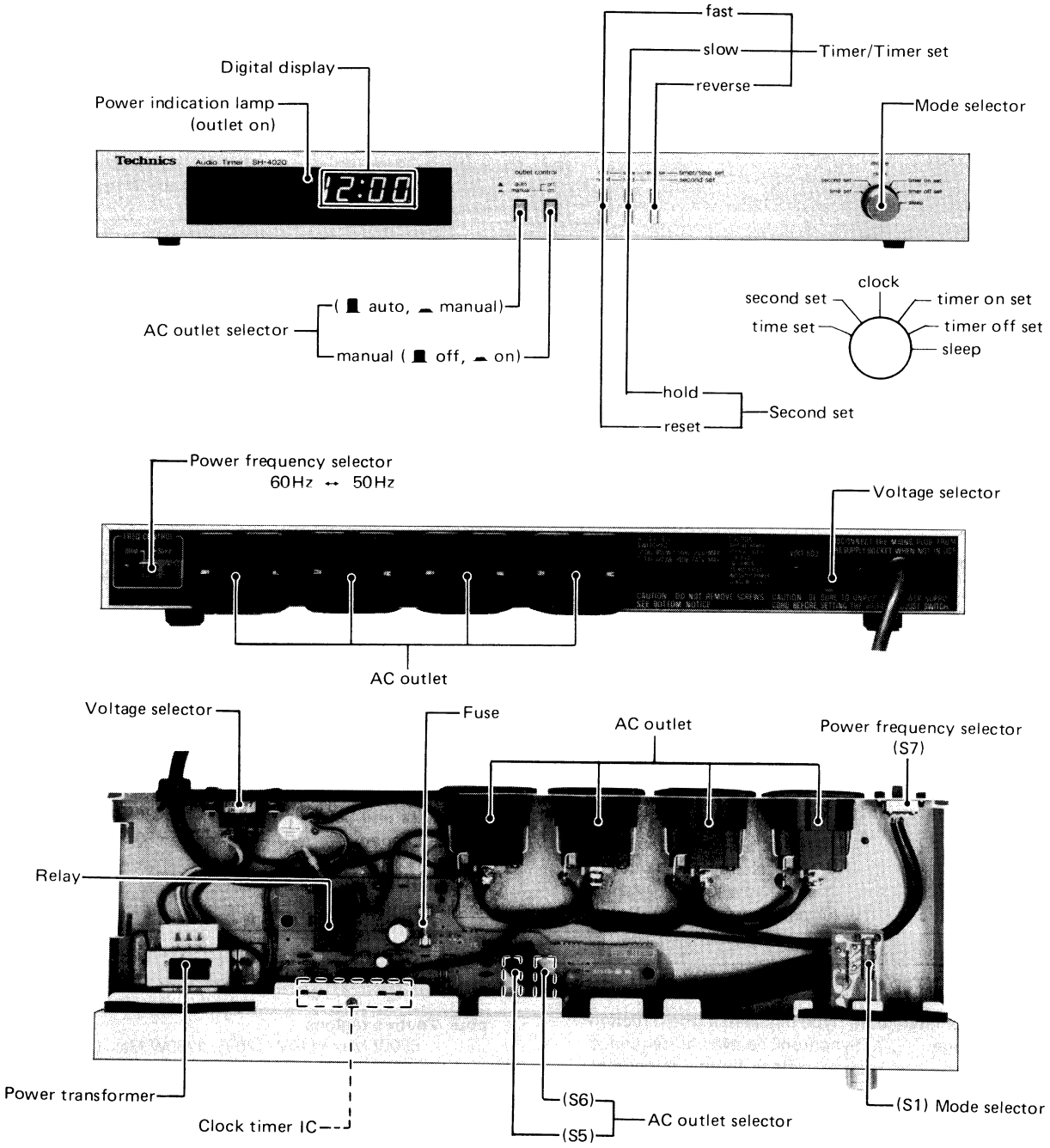
■ LOCATION OF CONTROLS



* This photo shows the [EG] area.
The shape of AC outlet of this unit differs with area.

■ FEATURES

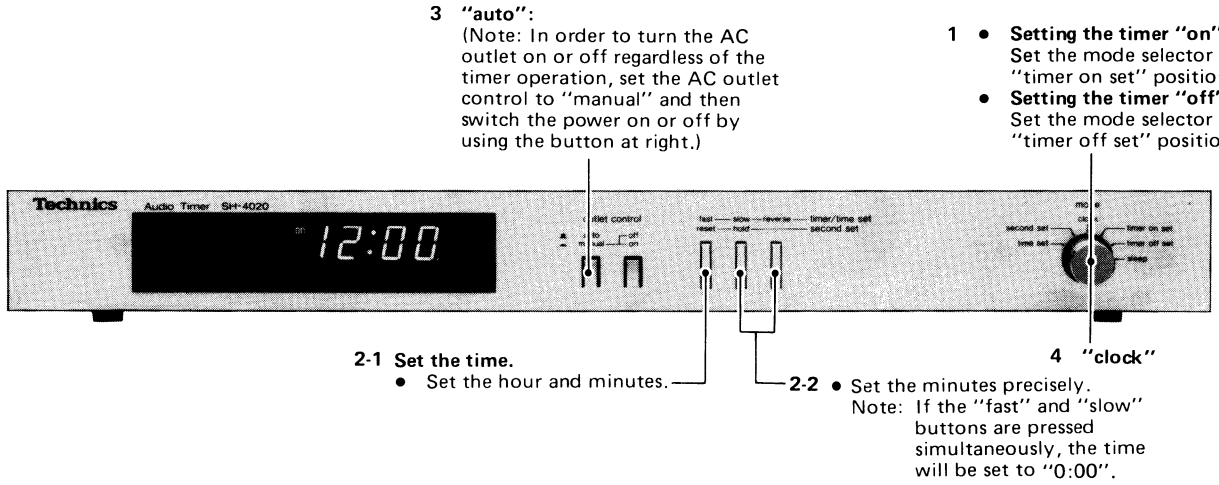
- Once-a-day on-off function.
- Sleep timer can be steplessly set in a range from 1 minute to 1 hour 59 minutes (display in minute only).
- AC power socket (interlocked with switch) of 680W max.
- 24-hour indication (easy-to-read FL display).
- Commerical power supply frequency synchronizing system.

■ HOW TO OPERATE

• Setting the timer (on/off time)

About the timer

The timer is used to turn the power on or off at preset times. If the AC outlet control is set to the "auto" (▬→▙) position, the power will be turned on at the preset "on" time, and off at the preset "off" time.


3 "auto":
(Note: In order to turn the AC outlet on or off regardless of the timer operation, set the AC outlet control to "manual" and then switch the power on or off by using the button at right.)
1 • Setting the timer "on" time:
Set the mode selector to the "timer on set" position.
• Setting the timer "off" time:
Set the mode selector to "timer off set" position.
Technics
Audio Timer SH-4020
12:00
2-1 Set the time.
• Set the hour and minutes.
2-2 • Set the minutes precisely.
Note: If the "fast" and "slow" buttons are pressed simultaneously, the time will be set to "0:00".
4 "clock"

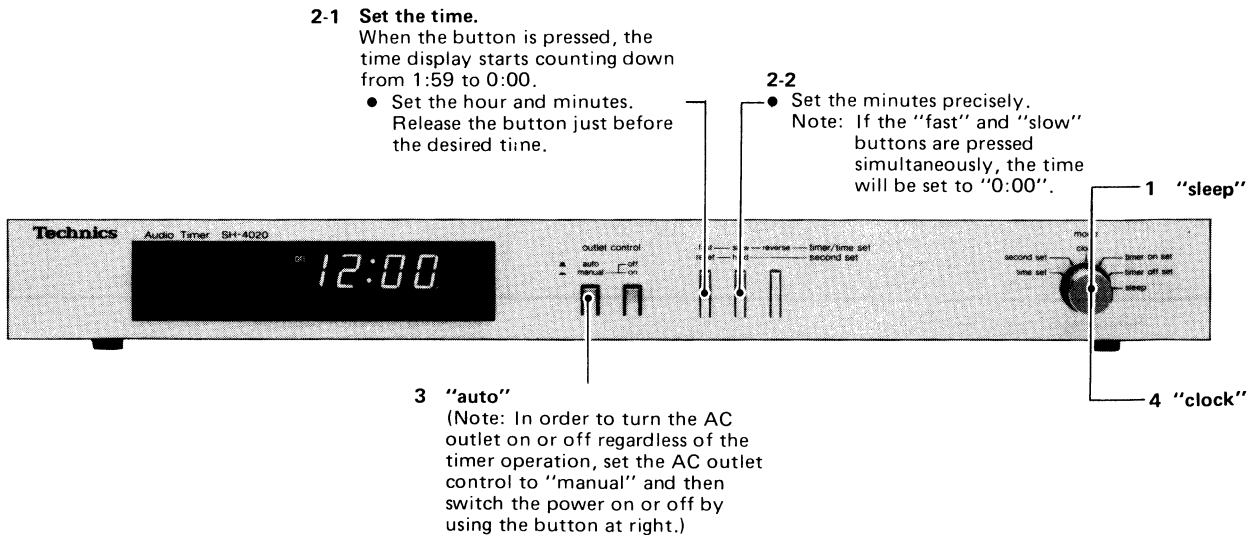
Notes:

1. If an amplifier, etc., is turned "on" by the timer and after one minute, the mode selector is set to the "timer on set" position, the power and the timer-controlled operation will be turned off.
2. The timer will not operate if the mode selector is set to the "timer on set" position.
3. The timer will not operate if the "on" and "off" times are set to the same time.

• Setting the sleep timer

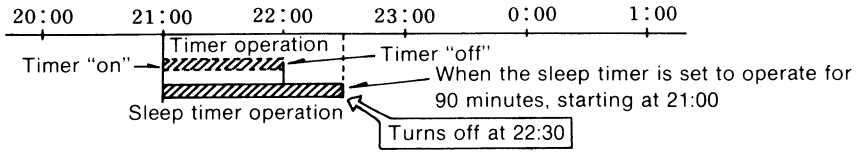
About the sleep timer

The sleep timer is used to turn the power off automatically at a preset time. The sleep timer makes it possible to go to sleep while listening to music. The timer will then turn the power of the audio unit off at the preset time.


2-1 Set the time.
When the button is pressed, the time display starts counting down from 1:59 to 0:00.
• Set the hour and minutes. Release the button just before the desired time.
2-2
• Set the minutes precisely.
Note: If the "fast" and "slow" buttons are pressed simultaneously, the time will be set to "0:00".
1 "sleep"
Technics
Audio Timer SH-4020
12:00
3 "auto"
(Note: In order to turn the AC outlet on or off regardless of the timer operation, set the AC outlet control to "manual" and then switch the power on or off by using the button at right.)
4 "clock"

Notes:

1. The sleep timer operates only once. It must be reset each time it is to be used.
2. If the timer operation (on/off) and the sleep timer operation overlap, the sleep timer operation will take priority.



■ DISASSEMBLY INSTRUCTIONS

- How to remove the printed circuit board.

1. Remove the 2 setscrews (Fig. 1 : ❶, ❷) of the cabinet.
2. Remove the 1 setscrew (Fig. 1 : ❸) of the FL bracket and move the FL bracket in the direction of the arrow Ⓐ in Fig. 1.
3. Remove the 3 setscrews (Fig. 1 : ❹ ~ ❻) of the front panel, and move the front panel in the direction of the arrow Ⓑ in Fig. 1.
4. Remove the 3 setscrews (Fig. 2 : ❼ ~ ❾) of the printed circuit board.
   (Raise the printed circuit board when repairing.)

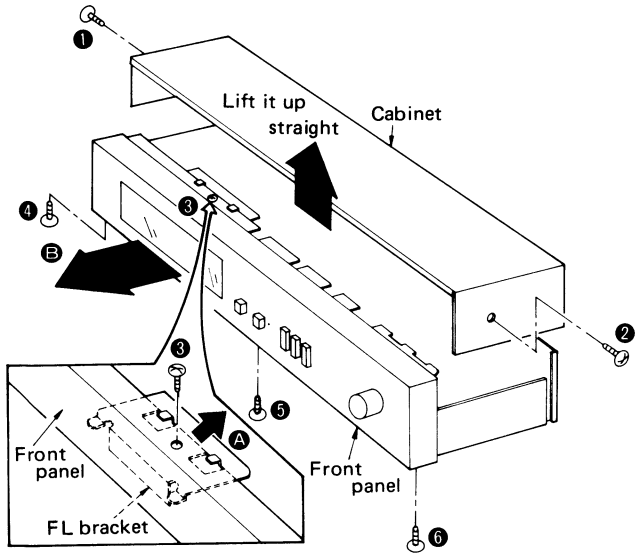


Fig. 1

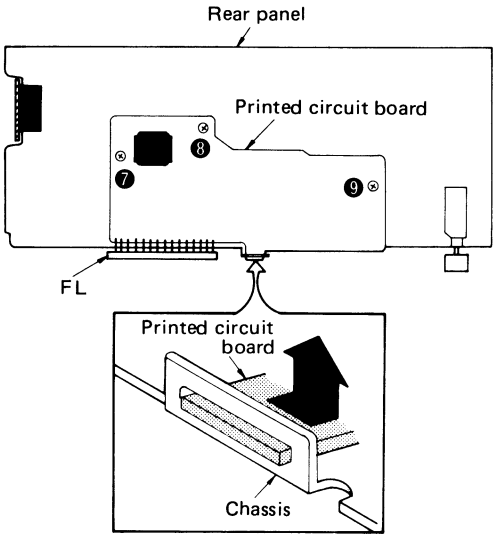


Fig. 2

■ REPLACEMENT PARTS LIST ..... Electrical Parts

Notes:
1. Parts numbers are indicated on most mechanical parts. Please this part number for parts orders.
2. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components use only manufacturer's specified parts.
3. The "**S**" mark is service standerd parts and may differ from production parts.
4. Unless other wise specified.
   All resistors are in OHMS(Ω), K=1000Ω, M=1000kΩ.
   All capacitors are in MICROFARADS(μF), P=μμF.

Ref. No.	Part No.	Description
INTEGRATED CIRCUIT		
IC1	MN6076	Clock Timer
TRANSISTORS		
Q1, 2	2SA733–P1	Switching
DIODES		
D1 ⚠S	SVDSR1K2	Rectifier
D2, 11	SVDMZ406B	6V, Zener
D3~9 S	MA162A	Switching
D10	SVDMZ409B	9V, Zener

Ref. No.	Part No.	Description
TRANSFORMER		
T1 ⚠	SLT5J181–W	Power Source
FLUORESCENT DISPLAY TUBE		
FL	SAD4LT40ZA	Timer
RELAY		
RLY1 ⚠	SSY81	AC Outlet

Ref. No.	Part No.	Description
FUSE		
F1 ⚠	XBAS2C025T1A	250V, T250mA
F11 ~ 14 ⚠ [EG] only	XBA2C63TRO	250V, T630mA
SWITCHES		
S1	SSR175	Mode
S2, 3, 4	SSG9	Timer Set
S5, 6	SSH2007	AC Outlet
S7	ESD14116	Allocation (50/60Hz)
S8 ⚠	ESE3787	Voltage Adjust

Numbering System of Resistor

Example

ERD	25	T	J	104
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : ±5%

Ref. No.	Part No.	Value
RESISTORS		
R1 S	ERD25TJ104	100K
R2 S	ERD25TJ333	33K
R5 S	ERD25FJ103	10K
R6, 7 S	ERD25TJ563	56K

Numbering System of Capacitor

Example

ECKD	1H	103	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

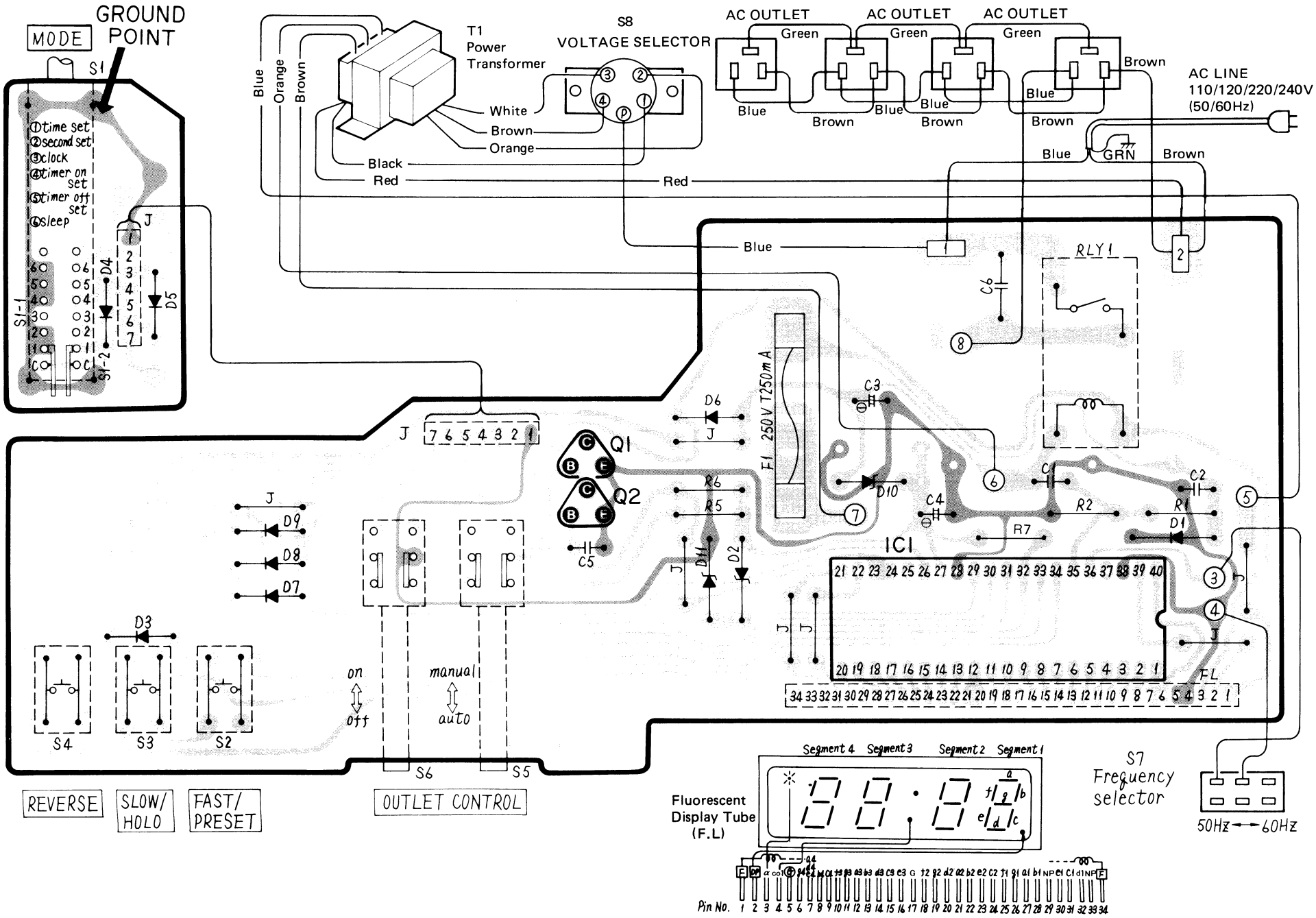
ECEA	1E	S	101
Type	Voltage	Peculiarity use	Value

Capacitor Type	Voltage	
ECEA : Electrolytic ECKD : Ceramic	1E : 25V 1V : 35V 1H : 50V KC : 400V	P : +100%, –0% Z : +80%, –20%

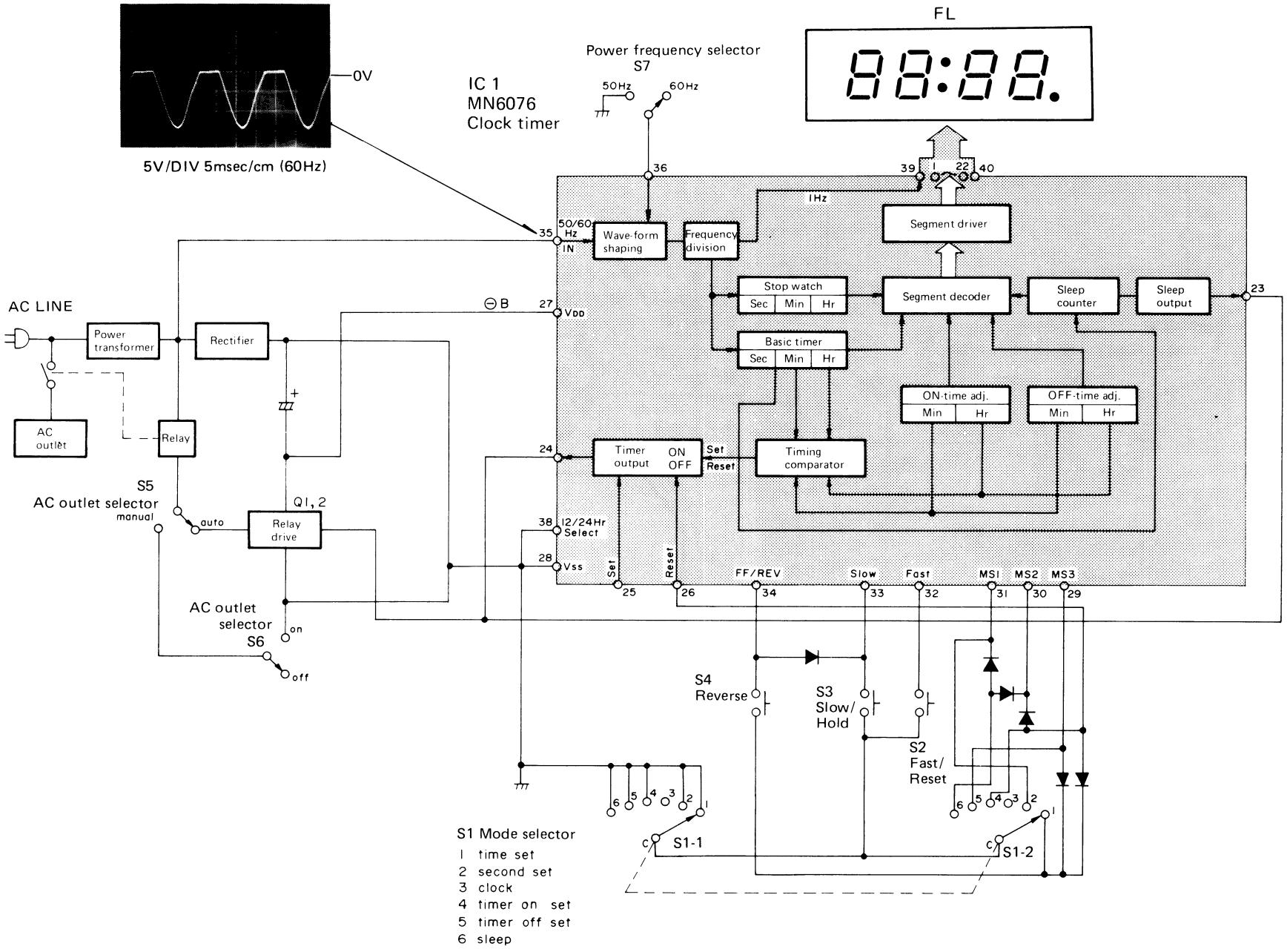
Ref. No.	Part No.	Value
CAPACITORS		
C1, 2 S	ECKD1H103ZF	0.01
C3 S	ECEA1VS471	470
C4 S	ECEA1ES101	100
C5 S	ECKD1H103ZF	0.01
C6 ⚠	ECKDKC103PF	0.01

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

Ground (Earth) lines



■ BLOCK DIAGRAM



■ SCHEMATIC DIAGRAM

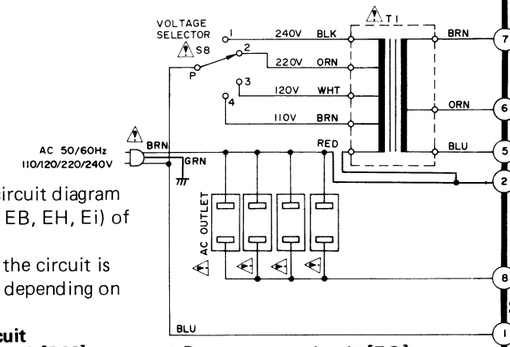
(This schematic diagram may be modified at any time with the development of new technology.)

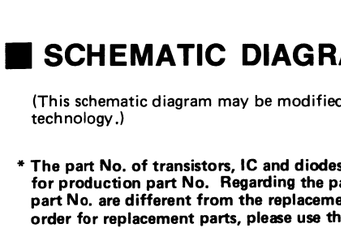
*** The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. without ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement parts, please use the part No. in the replacement parts list.**

Notes:

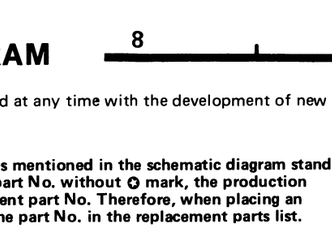
1. **S1** : Mode selector switch in "**time set**" position (① time set, ② second set, ③ clock, ④ timer on set, ⑤ timer off set, ⑥ sleep).
2. **S2 ~ S4** : Timer/time set switch
   [timer/time set (S2 : fast, S3 : slow, S4 : reverse)
   [second set (S2 : reset, S3 : hold)]
3. **S5** : AC outlet selector switch in "**auto**" position. (auto ⟷ manual)
4. **S6** : AC outlet selector switch in "**off**" position. (on ⟷ off)
5. **S7** : Power frequency selector switch in "**50Hz**" position. (50Hz ⟷ 60Hz)
6. **S8** : Voltage selector switch in "**220V**" position. (110V ⟷ 120V ⟷ 220V ⟷ 240V)
7. **RLY 1** : Relay in "off (normal open)" position.

* This is the basic circuit diagram (for DX, EK, EF, EB, EH, Ei) of this unit.
Note that part of the circuit is subject to change depending on the areas.

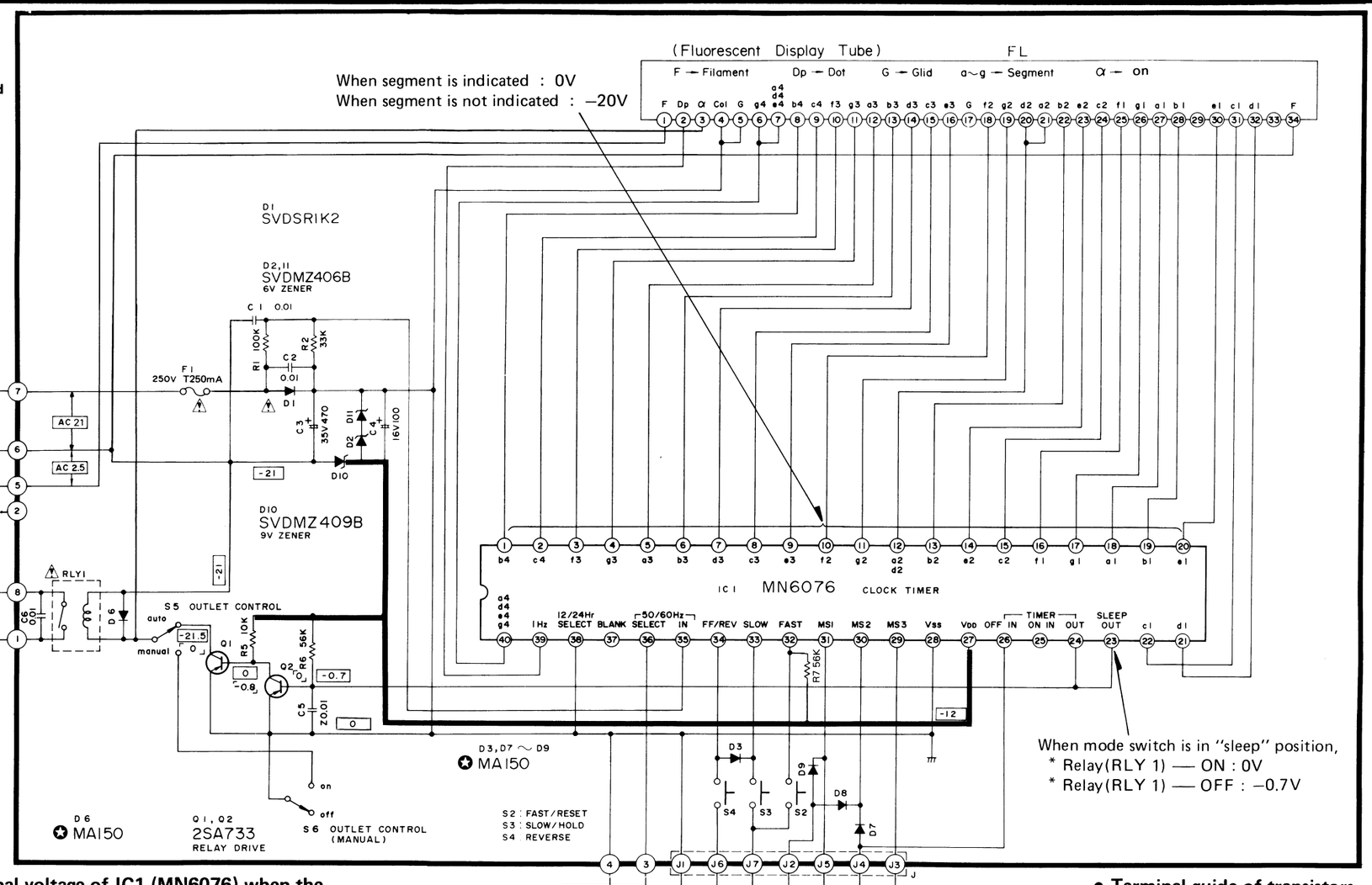


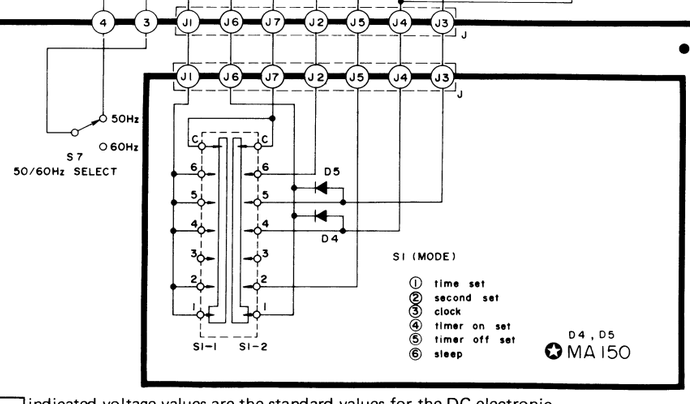


Product for Scandinavia and Denmark.



Product for F.R. Germany.





● Power source circuit [EW] and [DM] areas.

● Power source circuit [EG] area.

● Terminal voltage of IC1 (MN6076) when the fluorescent display is 0 : 10

(Unit: V)

Pin No.	MODE : time set, outlet control : manual/off	MODE : time set, outlet control : manual/on	Pin No.	MODE : time set, outlet control : manual/off	MODE : time set, outlet control : manual/on
①	−21	−19.5	㉒ ~ ㉔	0	0
②			㉕	—	—
③ ~ ⑩	0	0	㉖	−13	−10
			㉗	−14	−11.5
			㉘	0	0
⑪	−21	−20	㉙ ~ ㉞	−12	−10
⑫ ~ ⑯	0	0	㉟	− 5	− 4
			㊱	−12	−10
			㊲	—	—
⑰	−21	−20	㊳	0	0
⑱ ~ ㉑	0	0	㊴	12V p-p (1Hz)	12V p-p (1Hz)
			㊵	−21	−19

Terminal ㉜ with S2 depressed is 0V.
Terminal ㉝ with S3 depressed is 0V.
Terminal ㉞ with S4 depressed is 0V.

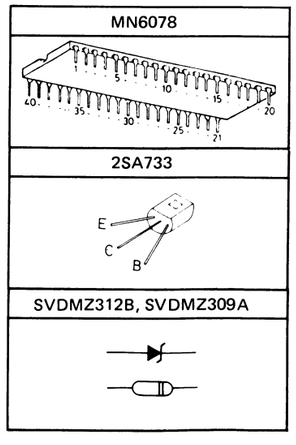
● Terminal voltage of IC1 (MN6076) when the fluorescent display 10 : 10 repeats blinking.

(Unit: V)

Pin No.	MODE : time set, outlet control : manual/off	MODE : time set, outlet control : manual/on	Pin No.	MODE : time set, outlet control : manual/off	MODE : time set, outlet control : manual/on
①	−21	−19	㉒	Same as wave form of terminal ㊳.	Same as wave form of terminal ㊳.
②	−21	−19	㉓	0	0
③	Same as wave form of terminal ㊳.	Same as wave form of terminal ㊳.	㉔	0	0
④	−21	−20	㉕	—	—
⑤ ~ ⑩	Same as wave form of terminal ㊳.	Same as wave form of terminal ㊳.	㉖	−12	−10
			㉗	−13	−11
			㉘	0	0
⑪	−21	−19	㉙ ~ ㉞	−12	−10
⑫ ~ ⑯	Same as wave form of terminal ㊳.	Same as wave form of terminal ㊳.	㉟	− 5	− 4
			㊱	−12	−10
			㊲	—	—
⑰	−21	−20	㊳	0	0
⑱ ~ ㉑	Same as wave form of terminal ㊳.	Same as wave form of terminal ㊳.	㊴	12V p-p (1Hz)	12V p-p (1Hz)
			㊵	−21	−18

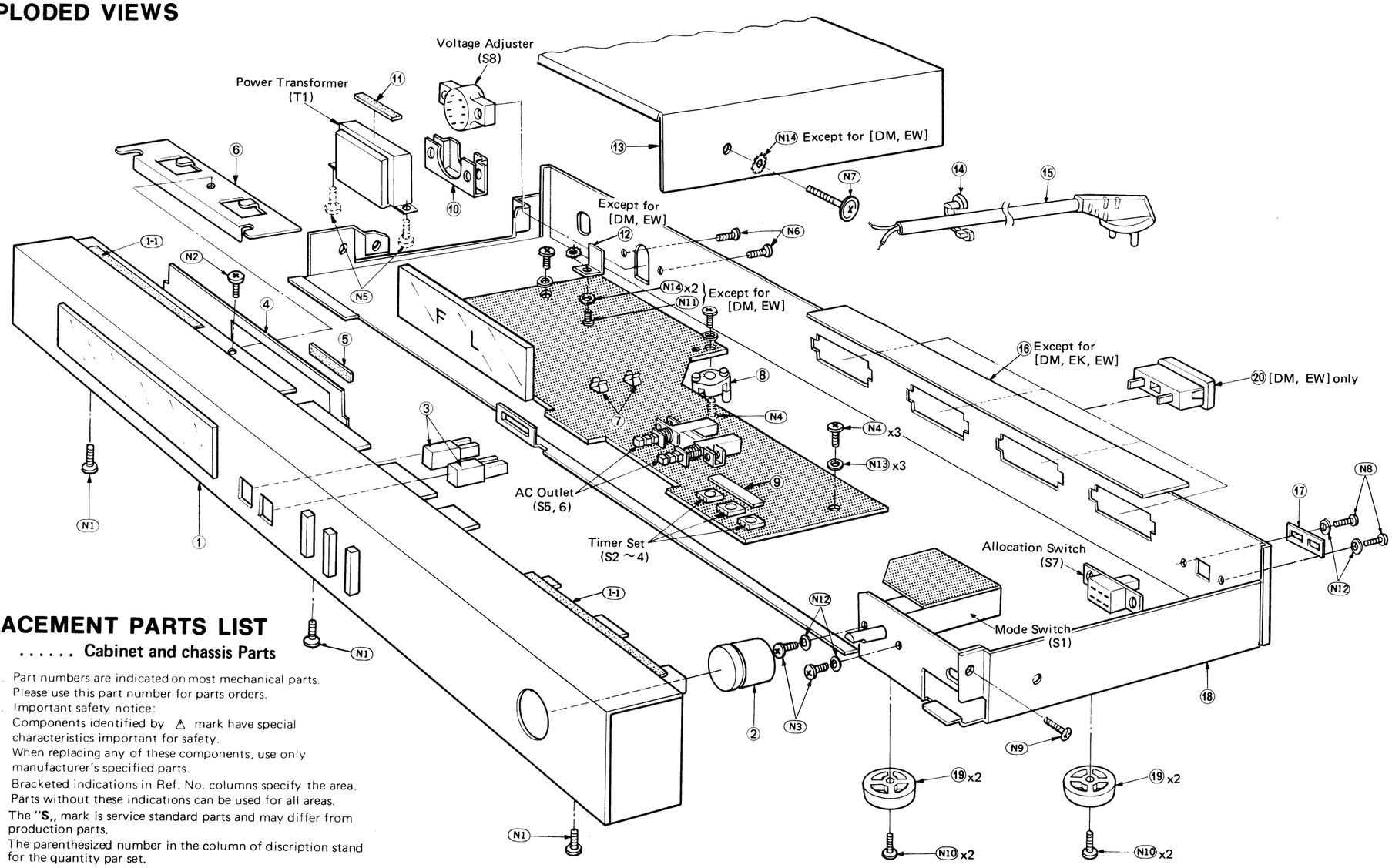
Terminal ㉜ with S2 depressed is 0V.
Terminal ㉝ with S3 depressed is 0V.
Terminal ㉞ with S4 depressed is 0V.

● Terminal guide of transistors, IC's and diodes



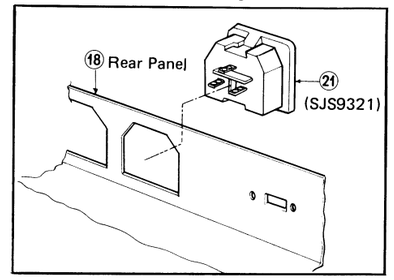
8. ▭ indicated voltage values are the standard values for the DC electronic circuit tester (high impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
   ⌜ ⌟ : Indicated voltage values are relay on.
9. ▬ Negative (−B) lines
10. Important safety notice:
    Componetns identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

■ EXPLODED VIEWS

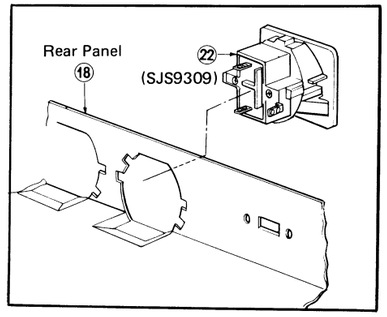


• AC Outlet and Rear Panel

[EK] ..... For United Kingdom.



[DX, EB, EF, EH, Ei, EG].... Except for United Kingdom, Denmark and Switzerland.



■ REPLACEMENT PARTS LIST

..... Cabinet and chassis Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by △ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "**S**,, mark is service standard parts and may differ from production parts.
5. The parenthesized number in the column of discription stand for the quantity par set.

Ref. No.	Part No.	Discription & Pcs.
CABINET and CHASSIS PARTS		
1	SYW541	Front Panel Ass'y (1)
1-1	[SHS3259	Spacer (2)
2	SBN993	Knob, Mode Switch (1)
3	SBC409	Button, AC Outlet (2)
4	SDU101	Filter, FL (1)
5	SHG1479	Rubber, FL (1)
6	SUW1887	Bracket (1)
7	SJT347	Holder, Fuse (2)
8	SHE73	Spacer, P.C.B. (1)
9	SHR5173	Spacer (1)
10	SMN1635	Bracket, Switch (1)
11	SHG647	Rubber, Power Transformer (1)
12 (Except for [DM, EW])	SJT791	Terminal (1)
13	SKC910S	Cabinet (1)
14 other areas	SHR131	Bushing, AC Cord (1)
14 [DM,EW]	SHR127	Bushing, AC Cord (1)

Ref. No.	Part No.	Discription & Pcs.
15 other △ areas	SJA103–1	AC Cord (1)
15 [DM] △	SJA97	AC Cord (1)
15 [EK] △	QFC1206M	AC Cord (1)
15 [EW] △	SJA111	AC Cord (1)
16 (Except for[DM, EK, EW])	SMX619	Shield Cover (1)
17	SHR5073–1	Stopper, Allocation (1)
18 other areas	SGPH4020DX	Rear Panel (1)
18 [DM]	SGPH4020DM	Rear Panel (1)
18 [EK]	SGPH4020E	Rear Panel (1)
18 [EW]	SGPH4020W	Rear Panel (1)
18 [EG]	SGPH4020G	Rear Panel (1)
19	SKL227–4	Foot (4)
20 △ [DM, EW]	SJS9225	Socket, AC Outlet (1)
21 [EK] △	SJS9321	Socket, AC Outlet (1)
22 other △ areas	SJS9309	Socket, AC Outlet (1)

Ref. No.	Part No.	Discription & Pcs.
SCREWS		
N1	XTBS3+8BFZ1	Tapping, with Detent (3)
N2 **S**	XTB3+8BFN	Tapping, ⊕ 3x8 (1)
N3 **S**	XSN3+6S	⊕ 3x6 (2)
N4 **S**	XTN3+8BFZ	Tapping, ⊕ 3x8 (4)
N5 **S**	XTB3+10BFN	Tapping, ⊕ 3x10 (2)
N6	XTB3+14BFZ	Tapping, ⊕ 3x14 (2)
N7	SNE2095	Tapping (2)
N8 **S**	XSN3+6S	⊕ 3x6 (2)
N9 **S**	XTS3+8B	Tapping, ⊕ 3x8 (1)
N10 **S**	XTB3+10BFZ	Tapping, ⊕ 3x10 (4)
N11 **S** (Except for [DM,EW])	XTB3+8BFN	Tapping, ⊕ 3x8 (1)
WASHERS		
N12 **S**	XWA3B	Spring, ϕ3 (4)
N13 **S**	XWG3FZ	Plain, ϕ3 (4)
N14 **S** (Except for [DM,EW])	XWC3B	External Tooted Lock, ϕ3 (4)

Ref. No.	Part No.	Discription & Pcs.
ACCESSORIES		
A1 △ [EK]only	SJP5309	Plug Adapter, AC (4)
A2 (Except for [EK])	SQF11155	Instructions Book (1)
A2 [EK]only	SQF11157	Instructions Book (1)
PACKING PARTS		
P1	SPP711	Polyethylene Bag (1)
P2	SPS3461	Pad, Left Side (1)
P3	SPS3463	Pad, Right Side (1)
P4	SPS3465	Pad, Upper (1)
P5	SPS3655	Pad, Bottom (1)
P6 (Except for[EF])	SPG3863	Carton Box (1)
P6 [EF]only	SPG3963	Carton Box (1)

Areas

* [EG] is available in F. R. Germany.
* [EF] is available in France.
* [EK] is available in United Kingdom.
* [EH] is available in Holland.
* [EB] is available in Belgium.
* [DX] is available in Scandinavia.
* [EW] is available in Switzerland.
* [DM] is available in Denmark.
* [Ei] is available in Italy.

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